EXPERIMENT -6

COLPITT'S OSCILLATOR

AIM: To design a Colpitt's Oscillator with following specifications and to verify the phase shift (180°) and find the frequency of oscillations.

DESIGN SPECIFICATIONS:

Vcc =12v, R1=18.3k, R2=6.8k, Re=1k, Rc=2.2k, C1=C2=1µF, L=1mH, NPN transistor with β value 100.

APPARATUS:

- CRO
- Regulated DC power supply
- Decade resistance Box
- Decade capacitance Box
- Decade inductance Box
- Resistors
- Capacitors
- Transistor
- Bread board, Single strand wires

SOFTWARE SIMULATION:

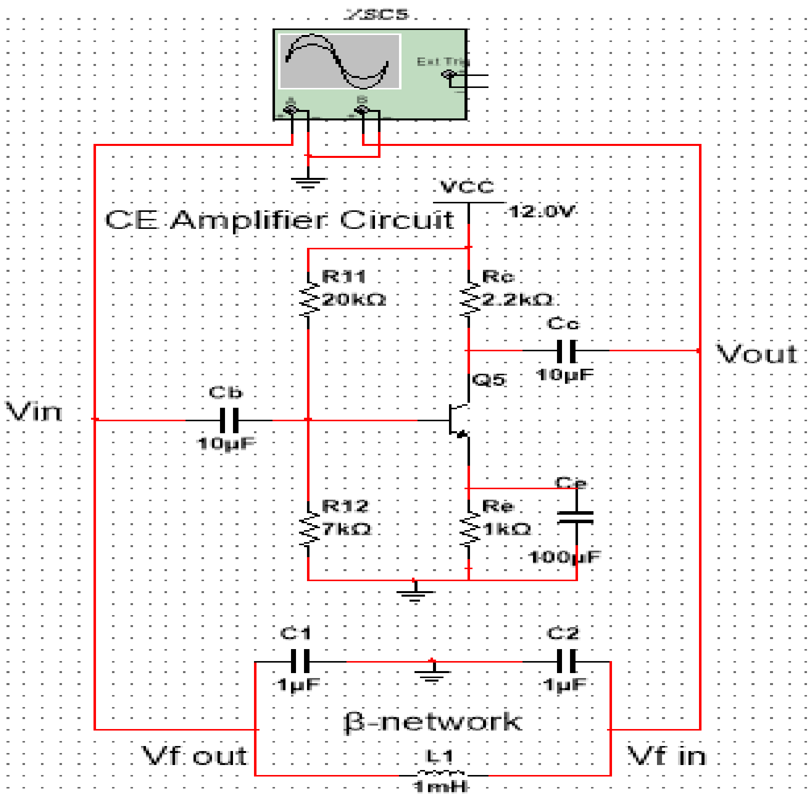
Software used: Multisim Analog Devices Edition 14.0

Procedure:

1. Switch ON the computer and open the Multisim software
2. Observe Design tool box, Instrumentation tool box, component tool box and its component functionality
3. From above tool boxes, Connect the circuit using the designed values of each and every component
4. Connect the output of amplifier to input of β-network[LC Combination] and output of β-network to input of amplifier.
5. Connect the Cathode Ray Oscilloscope (CRO) to the input and output terminals of the circuit.
6. Go to simulation button click it for simulation process.
7. From the CRO observe the following values:

- Frequency of Oscillations
- Phase Shift = 180^o

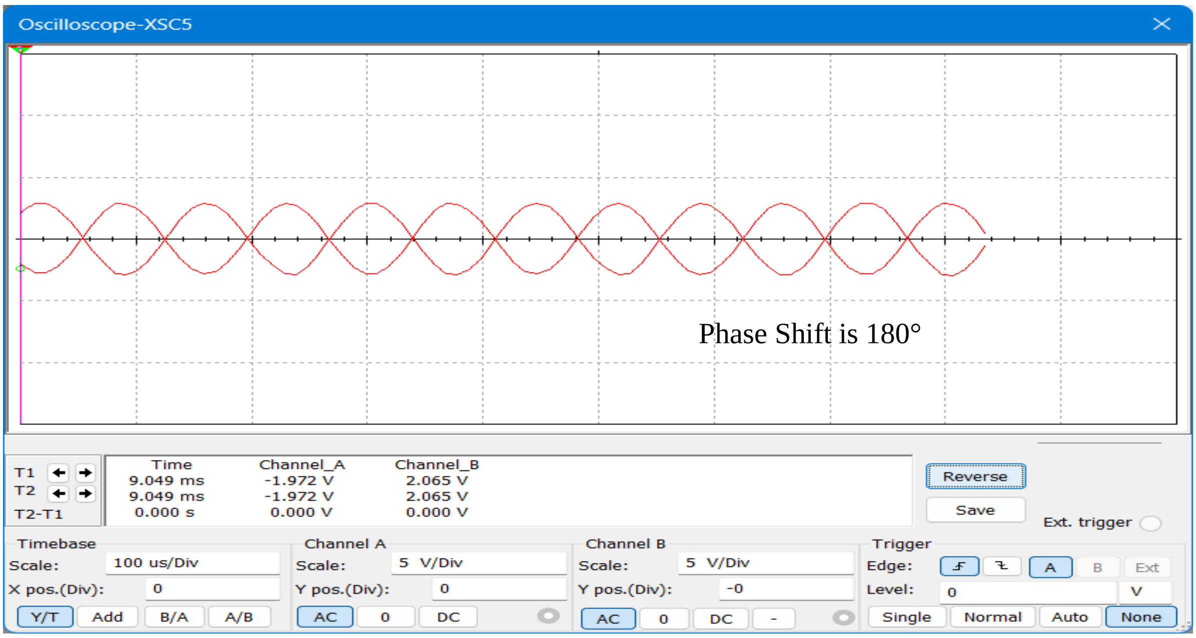
SIMULATION OF THE DESIGN:



Colpitt's Oscillator circuit

❖ OBSERVATIONS:

Phase Shift:



Conclusion:

From the above waveform we can conclude that the phase shift b/w input and output signal is 180°.

HARDWARE SIMULATION:

Procedure:

1. Connect the circuit as per the circuit diagram.
2. Apply the supply voltage , V_{cc}=12V
3. Make sure that the transistor is operating point in active region by keeping V_{CE} half of V_{CC}.
4. Now note down the frequency of oscillations generated for different inductance values.
5. Now calculate the theoretical frequency of oscillations generated.

Observations:

Colpitt's Oscillator

Inductance(H)	Frequency(Hz)

Conclusion: